

# DISEASES OF THE CHEST

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## Editorial Comment

### Connecticut has Murdered the Murderous Sanatorium Waiting List

upon the waiting list of a sanatorium, only to find out that by the time a bed is available, perhaps six months later, the disease has progressed to a stage where it is hopeless. It is true that in many communities, prompt ambulatory pneumothorax (and in a few, pneumoperitoneum) has reduced the frequency of this sad occurrence, but no physical procedure will avail where adequate diet and rest cannot be secured. How common it is in many communities to hear the doctor in the tuberculosis clinic say to the nurse, "Remove his name from the sanatorium waiting list, he is too sick to go!"

So, we may look with envy at Connecticut. With 591 deaths from all forms of tuberculosis (535 pulmonary), there is a present bed capacity of 1632, a planned (on order!) bed capacity of 1750, and no waiting list!

The excellent situation in Connecticut must be credited to the great Governor of that State, the Honorable Raymond E. Baldwin, and the splendidly functioning Tuberculosis Commission that was appointed by him.

Could anything be more tragic than the common human experience of being diagnosed as tuberculous while in a curable stage, placed

The Chairman of the Commission, John C. Stanley, a public spirited manufacturer of Bridgeport, Connecticut, has been Chairman of the Board of the Bridgeport (Conn.) Hospital for many years and is well versed in hospital management. Commissioners John T. Walsh, Ward T. Alling and Fannie Dixon Welch, have had long experience on this Commission and have greatly assisted in the development of the Sanatoria program of the State.

There is only one medical member of the Commission, but fortunately, he is Doctor Joseph I. Linde, Health Officer of the City of New Haven, Connecticut, Past Chairman of the Public Health Committee of the State Medical Society and Clinical Professor of Pediatrics and Public Health in the School of Medicine of Yale University.

We believe that if two physicians who devote all of their time to actually treating the tuberculous patient were added to this Board, it would constitute a Board that would be a model for the Nation. The reason for having the tuberculosis clinician on such a Board is the need of the knowledge that only he has of so many details that are very important to the individual patient and his care and welfare. Both of these physicians, ideally, should be nonpolitical. One should

be engaged in the private practice of chest diseases; the other, a sanatorium physician, who is not an administrator, but who physically treats the patients.

We are proud of Governor Baldwin and every member of his Tuberculosis Commission for their excellently operating tuberculosis sanatoria. They deserve the gratitude of all Americans.

The sanatoria were a pleasure to visit, modern, well equipped and staffed by enthusiastic, intensely interested physicians. There are 32 full-time physicians, 5 part-time dentists and a consulting staff of 15 physicians. This gives a better ratio than the 1 doctor to 50 patients set-up as stated in the Pennsylvania Plan of Tuberculosis Eradication.

All physicians, and if married, their families, are supplied with adequate houses or apartments separate from the buildings housing patients.

Congratulations, Governor Baldwin; Chairman Stanley and your Commissioners; Medical Staffs of Cedarcrest Sanatorium of Hartford, Laurel Heights Sanatorium of Shelton, The Seaside of Waterford, Uncas-on-Thames of Norwich, Undercliff of Meriden; and congratulations, People of Connecticut.

F. W. B.

#### Growth of The College of Chest Physicians

It is interesting to note that Fellowship in the American College of Chest Physicians is sought more by the Chest Specialists now than was the case in its first years of existence. This is true, in spite of the increased cost of the Fellowship. Over six hundred qualified chest specialists now comprise the Fellowship. So rapid is the rate of application, that very soon it will be a matter of embarrassment to a chest specialist if he is not a Fellow. He may automatically find himself in a very small group, most of whom are no longer looking forward.

F. W. B.

**Facing Facts** Probably no one questions the rationale or wisdom of having every patient suffering from pulmonary tuberculosis initiate his treatment by a period of hospitalization in a sanatorium. There are many times, however, when various factors and extenuating circumstances preclude this; and the treatment and destiny of the patient

have to be charted in the home. At other times, the long wait before entrance to the county or state institution require that the initial treatment be so inaugurated.

An ever increasing number of these patients need pneumothorax therapy early in the course of their illness—many of them immediately following the diagnosis. The question at once presents itself—and this is the essence of this editorial—of the proper conduct of pneumothorax treatment in this home group of patients. There are no facilities in the home for fluoroscoping these cases. The use of a portable x-ray machine would be prohibitive because of the expense; and the occasional examination, where afforded, would be of disproportionately little value because of the forced infrequency. It becomes necessary, therefore, to work in the dark in the home, or to have the patient make a trip to the doctor's office or to the clinic. It is almost axiomatic that satisfactory pneumothorax therapy cannot be given without fluoroscopic control; and continued thus over a long period approaches the status of malpractice.

The decision has to be made of either treating the patient blindly, at home, or having him go to the effort of dressing and making the trip to the doctor's office. The happiest solution of this dilemma would seem to be in the nature of a compromise. The first several treatments are given at the bed side; and subsequently, the case is carried along at the office. This permits time for a proper adjustment to the changed conditions in the chest; and allows opportunity for some lessening of the toxemia from the disease, before the patient is called upon to undergo the exertion entailed by the visits to the office.

As a preparatory or hardening process, the patient is permitted to sit up in a chair three to four hours daily—divided between the morning and afternoon periods of the day. This is usually begun after the second or third refill. There is an inherent pit-fall in this scheme that must be compensated for by a stern exercise of discipline and a frank understanding on the part of the patient. The snare of it is, that being able to dress and go to the office, imbues the patient with a false sense of security and is conducive to his or her yielding to the temptation to take

other and more liberties. To everyone who has engaged in treating tuberculosis, this tendency must be reminiscent of many experiences. If this error can be eliminated, if proper timing and common sense be invoked; then successful collapse therapy can be satisfactorily carried out in these home or clinic patients.

The cases developing an exudate can be more effectively and intelligently managed; the danger of over-insufflation guarded against and the premature loss of air space, avoided.

C. H. H.

**"Conclusions with Regard to the Further Campaign Against Tuberculosis"**

Under the above subheading in his outstanding and masterly article on "Tuberculosis and Industrialization," published in the August, 1940 issue of the *American Review of Tuberculosis*, Georg Wolff unequivocally states, "Diagnostic and therapeutic measures, therefore, always play the most important part in the campaign, especially the early finding and isolation of the open cases . . ."

This is further corroboration of the fact, if any is needed, that the Charity Tuberculosis Dollar, whether private or public, should be spent principally on these "diagnostic and therapeutic" measures, and not frittered away on unproductive reiterations of facts which are already known to the people who have been reached annually (usually before Christmas) and never will be known by the other 81 per cent who do not have money to donate to any charity and among whom is the highest incidence of tuberculosis.

F. W. B.

**The Preparedness Questionnaire**

The American College of Chest Physicians should feel proud of the response and whole-hearted support of its members in its effort to make a survey, from a military point of view, of qualified chest specialists in this country and its possessions. Out of 600 questionnaires mailed, 550 have been returned and completed. Of this number, 250 would no doubt be ineligible because of their physical condition and age. It is interesting to note that less than 10 per cent of the 550 are members of the Reserve

Corps of either the Army or the Navy. All of these, of course, are eligible for military service. There are 250 qualified chest specialists, according to this survey that are eligible for commissions in either the army or navy, so far as physical condition and age is concerned. The Committee on Military Affairs of the College is proud and happy to report that every one of the 550, regardless of his physical condition or age, expressed a willingness to serve if called. It is also interesting to note that the average age of the reserve officers and those who are eligible according to age and health will average well above 44 years. Preparedness questionnaires were received from all of our possessions, the District of Columbia, and every state but one.

A file of these completed questionnaires has been made by states, and presented to the medical departments of both the Army and Navy. If an emergency should arise, no doubt a great number of those specialists who are eligible according to age and physical condition will be offered reserve commissions and called to duty. The Military Affairs Committee is grateful to each and every physician for his quick response which is proof of his patriotism and humanitarianism. The part that chest specialists will play in an emergency is vital, not only to the armed forces, but in the economic situation which always arises following a National emergency.

C. M. H.

**Are You A Fellow?** Do you have the requirements for a Fellowship or an Associateship in the American College of Chest Physicians? If you have been contemplating applying for a Fellowship or an Associateship in the College, the following information should be of interest to you:

On January 1st, 1941, the fee for a Fellowship in the American College of Chest Physicians advances to \$50.00. Applicants for an Associate Membership are now required to file their application under the \$50.00 ruling. It is proposed to advance this fee to \$100.00 at the next annual meeting of the College.

The following Fellows who comprise the Membership Committee of the College will be pleased to assist you or furnish you with application forms for either a Fellowship or an Associateship in the College:

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## Current Concepts in the Medical Treatment of Tuberculosis\*

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The thoracic surgeon is playing an ever-increasing role in the treatment of pulmonary tuberculosis. His vision is unbounded, and his techniques improve splendidly. Operative procedures, excellent in conception, and brilliant in execution, have become somewhat standardized, and yet the medical practitioner plans what shall be done for the tuberculous person, steers large numbers through successful cure regimes, and exercises control over those who go to surgery. If there is a difference of opinion between the surgeon and the physician, the decision of the physician is conclusive. On tuberculosis hospital services, the physician and the surgeon are a team. The surgeon and physician have, or are expected to have, a thorough knowledge of both the medical and the surgical aspects of the case. The attitude of most physicians to surgery is conservative, serving as a check upon trends toward surgical adventures. This has proven to be a satisfactory arrangement.

The treatment of tuberculosis cannot be stated categorically. Each case must be studied and individual factors must determine types of treatment suitable for each. Perhaps some statement of what treatment seeks to accomplish is in order. Outstanding is the effort to change a positive sputum to a negative one. Obviously, this must occur in order to protect nearby and remote well tissues from invasion by bacilli, and also to protect those who come in contact with the tuberculous person. The conversion of a positive case to a negative one is a prime objective. When such conversion has been made permanent, the person returns to his community as a useful functioning entity, without danger to himself or to others.

There are large numbers of cases of reinfection tuberculosis which have healed spontaneously<sup>1</sup> when discovered by x-ray. Surveys of entire communities of apparently well populations uncover many cases of healed tu-

berculosis. The ability to heal tuberculous foci spontaneously is not the property of any one race, although minimal and healed lesions are discovered most often in those races whose intelligence and resources afford adequate chest studies at frequent intervals. Prior to healing, these may have been spreaders of the disease. It may be that a day will come when chest radiographs will be almost as important as individual drinking cups, and then no case capable of spreading disease will escape early detection.

Medical treatment of tuberculosis will be influenced by the type of pathology present in the individual. Simple benign exudative lesions, resulting from the invasion of lung tissue by small numbers of bacilli of less than maximum virulence, clear by resorption within a matter of months. This type of disease constitutes a resistant tissue response to tuberculin. It mainly consists of a serous flooding of aveolar ducts and alveoli, and is lobular in distribution. It represents an allergic tissue response to tuberculin antigenic stimulation. X-ray shows this as one or more patchy areas of homogeneous opacities most often located in the infra-clavicular region. Such lesions may produce no symptoms whatsoever.

At this point, it is well to emphasize that although pulmonary tuberculosis may produce such symptoms as tissue wasting, cough, night sweats, gastric disturbances, etc., to wait until one or more of these appear before clinching a diagnosis may prove fatal. Tuberculosis can most often be diagnosed in its easily curable minimal stage by means of roentgenographic studies.

Simple exudative lesions, showing no tendency toward tissue destruction, clear readily on bed rest as evidenced by serial x-rays. Experience aids greatly in designating types of pathology by x-ray interpretation.

It may happen that lesions thought to be of a benign exudative nature turn out to be malignant exudative, a type which excavates rapidly in contrast to the non-excavating character of the benign exudative. When

\* 7th Annual Series of Post-Graduate Lectures, Mercy Hospital, May 17th, 1940.

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faced by cavitation, one realizes that although the cavity will very rarely close, if there is no interference, such expectancy is dangerous and unwarranted. The cavity case will produce bacilli if the search is thorough. The presence of bacilli sets up an objective, namely, conversion of a positive situation into a negative one, by cavity closure and bacilli destruction.

Other types of pulmonary tuberculosis which excavate are the caseous pneumonic and the exudative productive. The caseous pneumonic type, usually a cavity or cavities surrounded by pneumonic areas, can be the most acute form of tuberculosis encountered. Exudative productive tuberculosis is that type which produces exudative and fibrotic changes in varying degrees with excavations of less extent than the caseous pneumonic. This brief description of exudative productive tuberculosis is incomplete, but suffices for the purpose of this discussion which is to focus attention upon a type of tuberculous disease in which vomicae occur. In any type, the cavity with bacilli germinating walls commands therapy such as can only be determined by frequent sputa studies, serial x-rays, and experience.

Induced pneumothorax, by which atmospheric air is admitted into a potential pleural space creating an actual space, is a medical procedure which should be done by the internist rather than the surgeon.

The lungs are suspended in a partial negative pressure. Therapeutic pneumothorax admits air, under regulatory conditions, until intrapleural pressures are raised toward those of atmospheric air sufficiently to remove the suction force of a relative vacuum upon an elastic body, the lung. The same process tends to neutralize intrapulmonary air pressures which force the lung outward into a relative vacuum. The elasticity of the lung is a factor<sup>2</sup> in returning diseased areas to their original fetal state, atelectasis. As the volume of lung is decreased, its bronchi are restricted in their ability to elongate<sup>3</sup> and to enlarge, thereby decreasing aeration and resulting in under-ventilation of the affected parts.

The pathophysiology of tuberculosis causes stenosis of the draining air vessels. Bronchiolar and bronchial stenosis<sup>4</sup> occurs in air ducts within and adjacent to areas of pul-

monary tuberculosis. Such stenosis may be partial or complete and is caused by allergic edema of bronchial mucosae, submucous edema, bronchial or bronchiolar caseation, ulceration, necrosis, fibrotic changes, or obstruction by tenacious secretions.

Partial or complete bronchial closure of air ducts to the cavity ultimately results in producing an anaerobic medium in which<sup>5</sup> tubercle bacilli are inhibited and die because tubercle bacilli are strictly aerobic. Need of rich supplies of oxygen on the part of the tubercle bacillus, which is a strict aerobe and which is not facultative, immediately suggests a means for bacillary extermination by the creation of an anaerobic state. That the tuberculous area of disease needs less oxygen rather than more oxygen, further confirms the proposition that rest ranks first in the tuberculosis cure regime. It also directly conflicts with the "fresh air in the lungs" idea. Fresh air has its values in cure routines for its reflex tonic action by way of the skin. It affords transmission to valuable sun rays and is a change of climate factor, but atmospheric oxygen within the bacillary sphere of action aids the development of virulent tubercle bacilli whose work is to destroy living tissue cells.

Air duct closures also permit gas diffusions between the gases of entrapped air and the gases of the surrounding blood capillary system. Gases diffuse readily through the respiratory membrane, which is composed of alveolar epithelium<sup>6</sup> and capillary endothelium. In this gas interchange, the respiratory membrane acts as a permeable membrane. By diffusion of gases, the oxygen of the entrapped air is lowered from that of atmospheric air (about 21%) until it approximates that of arterial blood, (about 5%) and, the almost negligible percentage of carbon dioxide of inspired air within the cavity, (0.03%) is raised to balance that of venous blood, (about 6%). Gas interchanges, however, being unequal, lower partial pressures within the cavity and so release atmospheric extensile force on surrounding healthy lung tissues. By lessening or destroying suction force in the intrapleural space, and decreasing the expansile force of air pressures within the diseased lung, partial or complete atelectasis follows, the volume of lung becomes less, and

cavities contract to smaller sizes until obliterated.

Tissues deprived of oxygen and in which the blood supply<sup>7</sup> is decreased, undergo fibrotic changes readily. As the volume of lung becomes less in partial and atelectatic collapse, whatever air remains is rich in CO<sub>2</sub> and poor in O<sub>2</sub>. A relative anoxemia exists. Also, the functional blood circulation becomes static while the nutrient blood circulation has only a minimal function to perform in an inactive sector. The combination, ischemia and anoxemia, is highly favorable to rather rapid fibrosis by means of which tissues injured by this disease are repaired or replaced.

Obstruction of bronchi and bronchioles to tuberculous areas, however, is not an unmixed blessing. Bronchial stenosis, causing lobular or lobar atelectasis, seals in anaerobes, facultative aerobes, spirochetes, fusiform bacilli, and others, causing bronchiectasis. Bronchiectasis in areas of healed tuberculosis is a common finding. It is the least of the evils.

Roughly, about 25 per cent of all cases of pulmonary tuberculosis are suitable for pneumothorax collapse therapy. Of these, about twenty-five per cent will benefit from the procedure. Over 202,000 persons<sup>8</sup> received treatment for tuberculosis in 1938. If the number of tuberculous sick was small, pneumothorax would not have an important place in treatment, but with reinfection tuberculosis affecting many thousands, the 25 per cent of eligibles for pneumothorax is a sizable figure.

Race does not affect results of collapse therapy. When comparable lesions between the races are compared, there are no appreciable differences<sup>9</sup> in mortality or morbidity. Studies of collapse by thoracoplasty, for example, may reveal higher mortalities for Colored than for White. "However, when these patients are checked one by one and matched with comparable cases of White patients . . . and due consideration is given to the form and degree . . . these discrepancies disappear."<sup>10</sup>

The Negro race has an excessive mortality rate. In hospitals this race shows markedly advanced lesions. Comparisons of racial reactions to therapy are most often based upon race rather than upon comparable pathology.

Studies concerning tuberculosis in Negroes are usually based upon necropsies or other end results. The approximately two-thirds of all cases which are easily curable remain undiscovered in most communities. They are probably symptom free minimal cases such as can only be discovered by x-ray.

Fluids in the pleura are a common complication of pneumothorax. They are most common during the first six months or the first year of pneumothorax. They are considered an allergic response of a sensitized pleura to the antigenic stimulation of tuberculin. If the pleura itself is not infected, the response may be a simple serous effusion, in which tubercle bacilli cannot be demonstrated. Such fluids disappear with the ending of antigenic stimulation of underlying pathology. If there is caseous disease of the pleura itself, bacilli will be present in the effusion. Secondary invaders readily convert harmless effusions to empyemas requiring active surgical therapy.

All pleural effusions, especially those whose origin is difficult to determine, require close search for tuberculous foci. A rather frequently overlooked origin is a paravertebral or vertebral focus.

Effusions run the entire gamut from harmless serous fluids to dangerous purulent effusions. Serous fluids tend to absorb, but are easily cross infected, no matter how perfect the technique of thoracentesis for treatment or diagnostic purposes. A few empyemas become encapsulated with their toxic action suppressed by extensive pleural thickening through fibrotic and calcific pleural changes.

Purulent effusions require surgical evacuation of pus and abolition of the space which they occupy. The space may be filled by re-expansion of the collapsed lung, sometimes following attempts to sterilize the pleural space. Rapid lung re-expansion may be hastened by oxygen lavage of the pleural space. Thoracoplasty may be resorted to when simpler procedures fail.

Every pleural effusion requires individual study even as does each case of reinfection pulmonary tuberculosis.

Carefully planned therapy for the individual is of paramount importance in the treatment of tuberculosis.

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## Suppurative and Necrosuppurative Bronchopneumonia

### Their Surgical Aspects

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The general subject of acute pyogenic infection in the lung is far too broad for consideration in this paper. However, some remarks must be made concerning acute suppurative pneumonia because this aspect of the subject has received but scant attention in the literature. This fact is all the more surprising since the disease is surely far from rare. There is not even a term in the Index Medicus to denote the infection. The term "acute suppurative bronchopneumonia" which was introduced at Mount Sinai Hospital a number of years ago by Doctors Harry Wessler and Coleman B. Rabin has been in common use at that institution since that time. It is employed to signify an acute suppurative infection in one or more bronchopulmonary segments. Glass<sup>1</sup> has defined the bronchopulmonary segment as a bronchus with its bronchioles and parenchyma, which he has demonstrated to be a separate and distinct unit. Each bronchopulmonary segment is of substantial proportions and occupies a correspondingly substantial area of the visceral pleural surface. Microscopically, necrosis is of course an essential part of suppurative bronchopneumonia. I have, however, employed the term "necrosuppurative bronchopneumonia"<sup>2</sup> to denote that form of suppurative bronchopneumonia in which necrosis is a grossly macroscopic and obvious element of the pathological process. In paragraphs to follow, necrosuppurative bronchopneumonia will be shown to be of special significance in a consideration of the surgical aspects of the disease under discussion.

Whereas acute suppurative bronchopneumonia may be secondary to such infections as measles or whooping cough, or may be a sequel to inhalation anesthesia or other forms of unconsciousness, or may be of metastatic or other origin, the disease will be considered here only as an entity which is unrelated to any known previous factor. As an entity, suppurative bronchopneumonia may be said to be characterized pathologically, by suppuration, either localized or diffused, situated in one or more bronchopulmonary segments; clinically, by fever of brief or prolonged duration, and the expectoration of varying quantities of pus without foul odor; and roentgenologically, by one or more areas of pneumonic infiltration. No one organism appears to be responsible for acute suppurative bronchopneumonia in view of the fact that the hemolytic streptococcus, streptococcus viridans, pneumococcus, staphylococcus, and other organisms have been cultured. Some of the roentgenologic features will be discussed, but a consideration of the clinical features can not be entered into at this time.

It is difficult to understand why such an important disease has been scarcely referred to in the literature unless one assumes either that it is so generally known that it is taken for granted, or that it is regarded as too rare to be reported. Assuming that not a few cases have been overlooked in the past, it is our impression that the disease has become much more prevalent in the past few years. In any event, the incidence of bizarre varieties with

unusual roentgenological features which we often regard as characteristic of necrosuppurative bronchopneumonia, appears to be much more frequent. It is this variant of suppurative bronchopneumonia not infrequently of possible surgical significance, or of definite surgical import which has a special bearing on the subject of this contribution.

In general, it may be said that suppurative bronchopneumonia appears to be a self-limited disease and that spontaneous subsidence undoubtedly occurs in the great majority of cases. For the purposes of this paper, only the evolution of the pathology of cases which may present surgical aspects should be traced. To begin with, the coalescence of areas of suppurative bronchopneumonia in one or more bronchopulmonary segments produces one or more suppurative zones of substantial proportions. If films are taken, and areas of rarefaction are seen in roentgenograms, necrosuppurative bronchopneumonia can be said to exist. Should coalescence and increase of such areas of rarefaction take place, a pulmonary abscess may be said to be forming. A further evolution, which can best be traced by successive roentgenograms, would be the appearance of a fluid level which, when of substantial proportions, is characteristic of pulmonary abscess. The existence of necrosuppurative bronchopneumonia and its complicating pulmonary abscess can, of course, be suspected when considerable quantities of pus are expectorated (which is not always the case), but an unequivocal diagnosis can be made only in the presence of well-defined fluid levels in roentgenograms. Not infrequently, the film only discloses a more or less dense homogeneous shadow which is merely indicative of pneumonic infiltration, until the sudden expectoration of a considerable quantity of pus is followed by the characteristic film with fluid levels.

The evolution of pleural infections secondary to suppurative bronchopneumonia should now be traced. The suppurative pulmonary focus, which is the source, is situated superficially in the bronchopulmonary segment and hence is prone to extend to or into the pleura. In some instances, the pulmonary focus is an abscess of substantial proportions, in others it is small and essentially subpleural (beneath

the visceral pleura) in position. Invasion of the pleural cavity by rupture of the former is usually characterized by localized pyopneumothorax or empyema, whereas pleural invasion by rupture of the latter is more often followed by diffuse empyema or pyopneumothorax. In either case, there is usually actual rupture of the pulmonary abscess into the pleura with the demonstration of an open bronchial fistula in the pulmonary cavity either at the time of an operation or some time during the postoperative course. In view of this statement, the existence of fluid levels due to air in the infected pleural space might be anticipated in all cases. That this is not true in all cases is due to the fact that in some the orifice of the open bronchus in the floor of the perforated pulmonary cavity is blocked by pus or purulent exudate or debris. In contrast to the ordinary pneumonias, in which empyema by seepage appears to be the usual mechanism of invasion, such a demonstrable evolution of empyema complicating suppurative bronchopneumonia is decidedly rare in my experience. From the foregoing remarks it is evident that the pulmonary abscess which produces the pleural infection may be of substantial proportions and hence persist despite rupture into the pleura. Reference will be made shortly to the clinical significance of this observation. The features of unperforated and of perforated acute pulmonary abscess complicating suppurative bronchopneumonia will now be taken up, and there will follow a brief discussion of subacute and chronic abscess and of interstitial pneumonitis and bronchiectasis complicating suppurative bronchopneumonia.

#### *Pulmonary Abscess*

The continuation of fever without the roentgenologic, or other evidence of spread of bronchopneumonia, is not without significance. It may be due to spillover from the known area of pulmonary involvement into some distant area. Lacking roentgenologic or other evidence that that is the case, such continuance of fever, particularly with intensification of the shadow of the area of pneumonic infiltration, should lead to the suspicion that a pulmonary abscess (or possibly an empyema) may be forming in the area of bronchopneumonia. If areas of rare-

faction had already existed in roentgen films, their coalescence points to the likelihood of a pulmonary abscess. However, as already stated, the appearance of one or more actual fluid levels in the roentgenogram is the sole basis for the unequivocal diagnosis of a pulmonary abscess.

For clinical purposes, a differentiation should be made between three forms of pulmonary suppuration complicating suppurative or necrosuppurative bronchopneumonia: (1) One or more areas of diffuse suppuration in the midst of a larger area of bronchopneumonia; (2) Circumscribed pulmonary abscess in the midst of bronchopneumonia; (3) Circumscribed pulmonary abscess with limited surrounding bronchopneumonia. In view of the fact that, in my opinion, the last mentioned comprises the sole lesion for which operative treatment may be indicated, every effort should be made to distinguish it from the first and second forms of suppuration. When the roentgen film of a circumscribed pulmonary abscess is typical, there exists a cavity with fluid level that is clearly demarcated from the adjacent lung by a narrow zone of infiltration. However, this typical film is not always encountered. Hence, the type of pulmonary abscess which may be called "surgical" may be roentgenologically indistinguishable from the other varieties if the cavity is more or less full of pus or if a dense pleural reaction obscures the pulmonary lesion. As has already been noted, the expectoration of a considerable quantity of pus may be followed by a film which is typical of pulmonary abscess whereas theretofore the film may have only indicated the existence of pneumonic infiltration.

The clinical course in cases of acute pulmonary abscess should be a basic guide to management. If the roentgenologic and clinical evidence point to the existence of much pulmonary infiltration in addition to the abscess, operative treatment can offer little or no outlook for a result. The same statement unfortunately must be made for those cases in which multiple collections of pus exist in the midst of an extensive area of suppurative bronchopneumonia<sup>2</sup>. When, however, there is encountered the typical abscess to which reference has been made, three indications for operation may arise: (1) The

necessity to terminate a septic course which may be fatal, or to terminate the extension of direct spread of the abscess or of spillover from the pulmonary abscess to distant parts of the lung; (2) The necessity for drainage of a pulmonary abscess when perforation of the abscess into the pleura seems imminent; (3) The necessity for liberal drainage of a pulmonary abscess of substantial proportions in cases of empyema or pyopneumothorax when only a small opening into the pleura exists. If the operative indications are limited to the foregoing, the necessity for operative treatment of acute aerobic abscess of the lung will arise only with relative rarity. For it is a fact that substantial areas of suppuration in the midst of suppurative bronchopneumonia will often subside spontaneously. On the other hand, the limitation of operative treatment to the imperative indications which have been laid down, will invite excellent results in those cases which are operated upon. The excellent results can be anticipated on the basis of the following observations culled from our experience: the abscess lies superficially within the lung in all cases, and the shell of lung which is interposed between the abscess and the overlying pleura is thin and compressed. There are always agglutinating viscero-parietal adhesions over the abscess so that the abscess can be entered safely at a one stage operation, if precise anterooperative roentgenologic localization is made.

A detailed discussion of operative technic would be out of place. Briefly, it can be stated that resection of more than a section of one rib is rarely required, and that the operation consists essentially of incision of the abscess through the area of adhesions and excision of that part of the roof of lung over the abscess which is thin and essentially avascular. After the evacuation of the contents of the abscess, a careful inspection of the interior is made in order to ascertain the presence or absence of additional loculations of pus. Secondary extensions, when they exist, must also be unroofed. Gauze packing of the abscess cavity is employed.

Recovery occurred in all the cases of typical acute abscess which were subjected to operation.<sup>2</sup> On the other hand, the few instances in which operation was performed in the pre-

sence of multiple areas of suppuration or of extensive bronchopneumonia were uninfluenced by operation or were made worse. Hence, it is clear that operation is indicated only in cases of well encapsulated and typical pulmonary abscess and that excellent results can be anticipated when operations are performed under such circumstances.

#### *Acute Pulmonary Abscess Perforating into the Pleura*

As has already been noted, the recognition of the stage of imminent perforation may be difficult or impossible. When frank perforation into the pleura has occurred with the appearance of a pyopneumothorax, there can of course be no doubt as to the operative indication. It is obviously desirable to proceed with operation whenever possible before gross involvement of the pleura has taken place. By close observation and roentgenograms at frequent intervals, the stage of imminent invasion of the pleura or of actual involvement of the pleura may be recognized. The management of a pulmonary abscess in which perforation is imminent is essentially identical with that which was outlined in the previous paragraph. When perforation of a substantial abscess into the pleura has taken place, the procedure generally employed at the present time consists of drainage of the pleural infection with little or no attention to the underlying pulmonary abscess. Such a plan may be justified if the symptoms of pulmonary abscess had abated after rupture, thus indicating a large opening between the pulmonary abscess and the pleura, or a relatively small pulmonary abscess. When, however, as is not infrequently the case, the symptoms of pulmonary abscess, in particular the expectoration of pus, continue after perforation into the pleura, drainage of a pulmonary abscess of substantial proportions is required as well as drainage of the infected pleural cavity. In my opinion and experience, the indication for such a procedure clearly exists when the pyopneumothorax or empyema is encapsulated and relatively small, but especially when the collection of pus is interlobar.<sup>3</sup> Both forms of drainage can be established at one operation unless the patient's condition precludes any procedure other than emergency pleural drainage.

The only difficulty which exists at the time of operation is the discovery of the perforation of the pulmonary abscess. If, however, this is carefully sought for it will usually be found. The unroofing of the pulmonary abscess is a simple procedure. In leaving this debatable question it should be stated that emphasis has been placed on the desirability of draining a perforated pulmonary abscess under the stated circumstances because a number of instances have been seen in which the omission of such drainage has been followed by chronic pulmonary abscess or by persistent fistula between lung and pleura, both conditions presenting problems which were difficult of solution.

The foregoing discussion of the management of acute aerobic abscess which has infected the pleura, is concerned solely with pulmonary abscesses of substantial proportions. Many cases of pyopneumothorax, especially in children, are derived from relatively small or sometimes minute areas of pulmonary suppuration beneath the visceral pleura. These are not under consideration in this paper for in them the problem of the unroofing of the pulmonary suppurative focus does not exist and the immediate problem is solely the management of the pleural lesion.

The subject of the unperforated or perforated pulmonary abscess cannot be left without calling attention to the fact that differentiation is at times impossible. Even large fluid levels extending to the surface may exist in the presence of an unperforated pulmonary abscess. On the other hand, a pyopneumothorax may exist when the roentgenologic evidence points apparently towards an unperforated lesion. In our series of cases, the error has been made in both directions upon a number of occasions. Nothing is lost by such an error, however, since the indication for operation is essentially the same in both instances. In doubtful cases, the necessity for precise localization of the lesion becomes even more apparent than in cases of unquestioned pyopneumothorax. A small encapsulated empyema or pyopneumothorax may be situated in a relatively inaccessible region such as an interlobar fissure. The avoidance of exploratory aspiration for pus should also be emphasized if there is any great likelihood that the

collection of pus is confined to the lung, or if only a small empyema or pyopneumothorax is thought to be present. Under such circumstances, the free pleura may be traversed by the aspirating needle in the search for the collection of pus. Hence, aspiration in such cases, if performed at all, should be carried out only in the operating room at a time when operation can be proceeded with at once if pus is encountered.

#### *Subacute and Chronic Abscess*

Whereas putrid abscess of the lung is commonly encountered as a subacute or chronic disease, when effective treatment has not been instituted in the acute stage, subacute or chronic aerobic abscess of the lung is rare regardless of the treatment during the acute stage. The reason is to be found in the fact that acute aerobic abscess of the lung usually subsides spontaneously, or is fatal, or perforates into the pleura. In the rare instances of subacute and chronic abscess which have come under observation, the lesion has been characterized by an exceedingly stiff-walled overlying shell of lung and multilocularity of the pulmonary lesion. Much more common have been instances in which an empyema or pyopneumothorax has been drained during the acute stage of the disease without drainage to the underlying perforated pulmonary focus. In these cases a perforated subacute or chronic abscess existed with a small communication between the interior of the pulmonary cavity and the floor of the pleural cavity. Pulmonary abscesses of substantial proportions were found in several of these chronic cases at the time that they came under observation, and the surgical management consisted essentially in the unroofing of the chronic pulmonary abscess. One or more bronchial fistulae existed in all instances. Prolonged postoperative treatment was the rule and the results were by no means uniformly satisfactory. At best, the healing was slow in all because of the duration of the infection in the lung and the stiffness of the walls of the pulmonary cavity.

#### *Interstitial Pneumonitis and Bronchiectasis*

The occurrence of this complication of bronchopneumonia following infectious diseases in children, is too well known for comment. It does not appear to be so well known, however, that a similar sequence of events can also occur following suppurative bronchopneumonia in adults or children, unrelated to any previous disease. Bronchiectasis has been noted to develop during the course of acute suppurative or necrosuppurative bronchopneumonia of even a few weeks' duration. The recognition of the presence of the causative interstitial pneumonitis can be based only upon the evidence that bronchiectasis exists. Such proof is forthcoming only by means of bronchography. In a number of instances,<sup>4</sup> the existence of bronchiectasis was demonstrated during the course of suppurative bronchopneumonia, the disappearance of bronchiectasis was demonstrated after convalescence was completed. It is probable, however, that such instances are exceptional, and that once established, bronchiectasis will usually persist and increase if appropriate treatment is not instituted.

It is important to place emphasis upon the necessity of recognizing interstitial pneumonitis and bronchiectasis in their early stages, for the disastrous results of confirmed bronchiectasis are well known. The likelihood of obtaining a satisfactory result by conservative therapy exists only in the early stages of bronchiectasis, and it is only in that period that such measures as pneumothorax or phrenicectomy offer an outlook for amelioration or for cure.

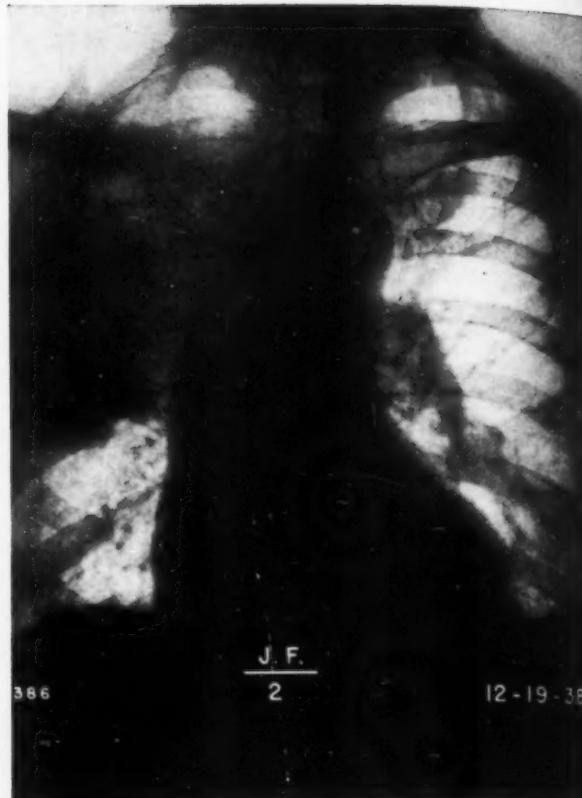
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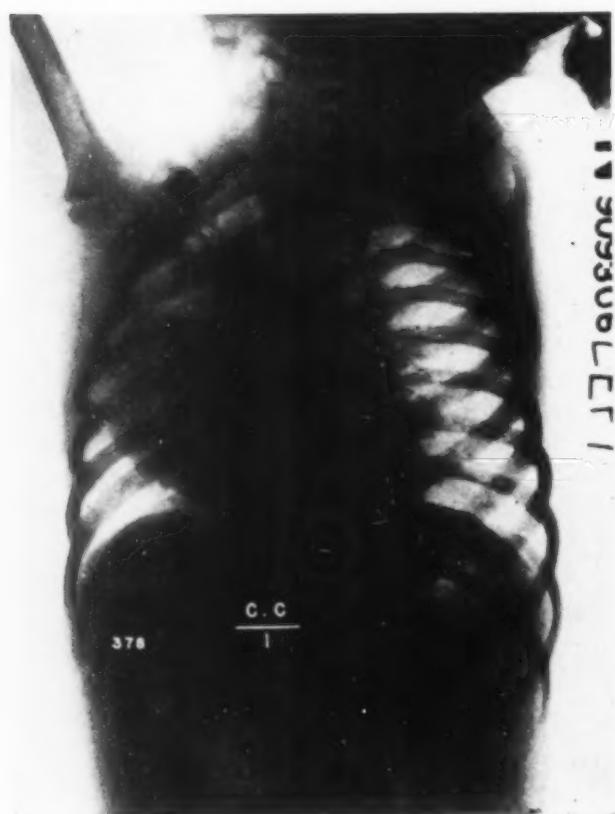
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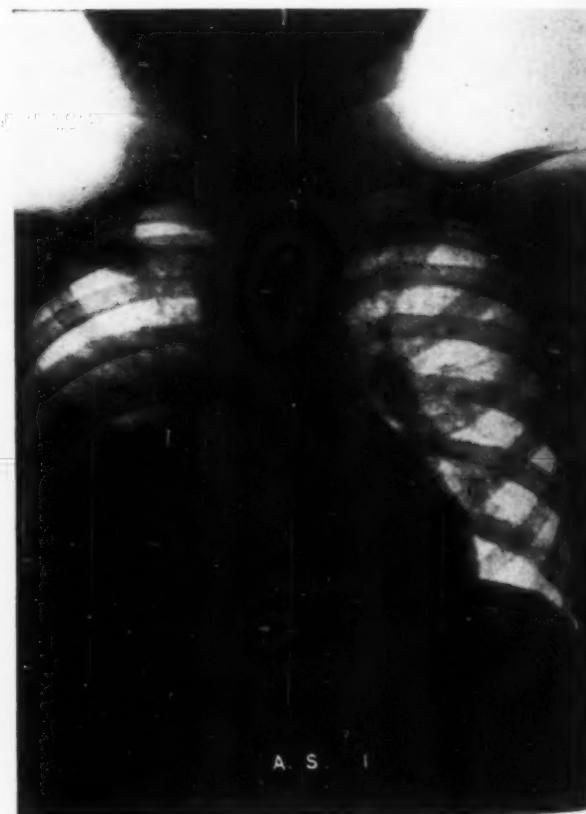
*Figure 1.*—Suppurative bronchopneumonia simulating tuberculosis. Subsequently a dense homogeneous shadow occupied most of the right upper lobe. The clinical course was bland. Spontaneous subsidence.



*Figure 2.*—Large area of necrosuppurative bronchopneumonia with one obvious fluid level. Prolonged septic course. Spontaneous resolution.



*Figure 3.*—Large pulmonary abscess entirely confined to the lung. Staphylococcosis. Satisfactory course after pneumonotomy and drainage with subsequent transplantation of fat for the obliteration of the drained pulmonary cavity.



*Figure 4.*—Typical pulmonary abscess with relatively little surrounding infiltration. Prompt recovery following pneumonotomy and drainage. Postero-anterior view.



Figure 5.—Same case as Figure 4. Lateral view.

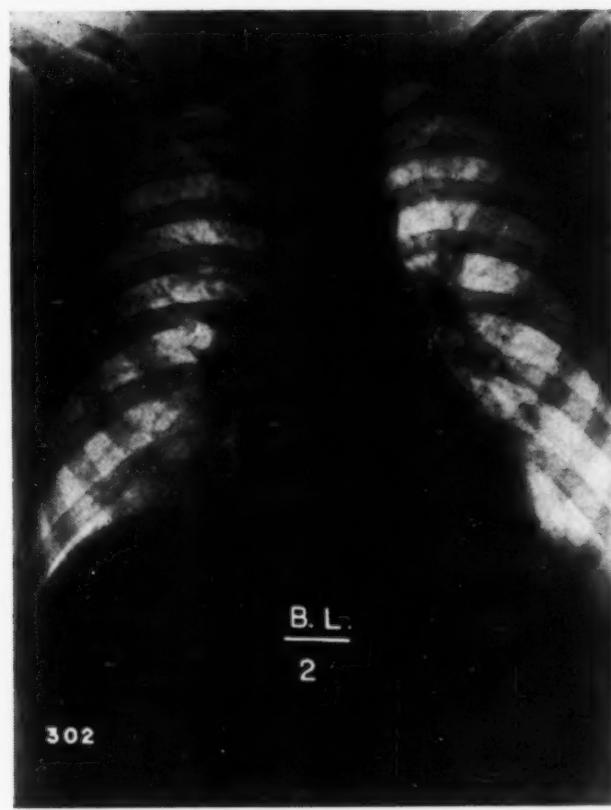


Figure 6.—Early stage of suppurative bronchopneumonia of the right lower lobe.

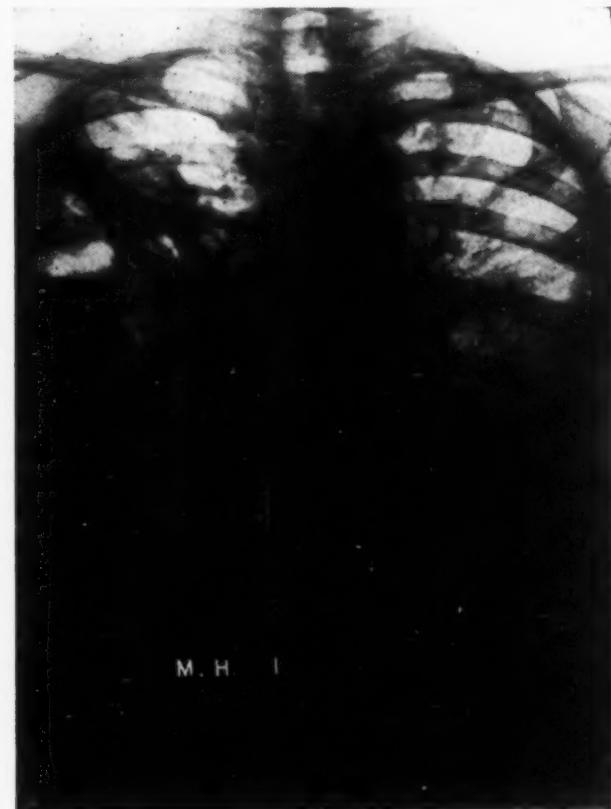


Figure 7.—Same case as Figure 6 showing the rapid evolution of necrosuppurative bronchopneumonia, perforation into the pleural cavity, and pyopneumothorax under tension.

Figure 8.—Multiple areas of necrosuppurative bronchopneumonia. On the right side perforation of one focus with pyopneumothorax; on the left side, empyema. Drainage of both pleural lesions at different times. Spontaneous healing of pulmonary foci.

# Bilateral Pulmonary Abscess Secondary to Pneumonokoniosis

## Its Occurrence in a Molder

WILLIAM B. FAULKNER, JR., M.D.\*

San Francisco, California

Molding is an industrial hazard because "molder's graphite," a black dusting powder used in the work, contains large quantities of silica, iron and carbon. This powder, being shaken through the meshes of a small bag upon the mold many times during the day, rises in the air in the form of dust which is inhaled by the workers.

We have yet to see a molder who did not complain of the irritating effects of foundry dust. Several, to our knowledge, quit the trade and took up less profitable work solely because of the frequent colds that resulted from using molder's graphite.

When a person has been a molder for but a short time, he expectorates the graphite and blows it from his nose. But with longer employment, more of this dust is inhaled than can be expelled. As a consequence, storage takes place within the lung. Mechanical and chemical trauma ensue, pulmonary lymphatic drainage is impaired, and pneumonokoniosis develops. The worker then becomes a prey to frequent respiratory infections which are slow in resolving, and the possibility of a pulmonary complication such as lung abscess is enhanced. Mortality is also increased.\*\*

The following case may be of interest, because, as far as we are aware, it is the first

on record of bilateral pulmonary abscess secondary to pneumonokoniosis. In addition to this, two important facts were noted at necropsy; namely: (1) the lungs were involved by very extensive pneumonokoniosis despite the fact that the insurance company had denied the presence of the condition two weeks before, and (2) the dust involvement of the lungs was much more widespread than even the x-rays demonstrated.

### Case Report

The patient, aged 66, had worked 38 years as a "bench molder" in a stove foundry before noticing any shortness of breath or severe bronchitis. But during the next ten years of his work, dyspnoea and weakness became distressing symptoms, and "colds" were of such frequent occurrence that he had to discontinue molding and turn to core-making.

As time went on, the cough and dyspnoea became increasingly troublesome, appetite failed, weight declined, and strength decreased. Finally, too weak and ill to do anything else, he was appointed to a minor supervisory position.

Although he had been expectorating black mucus and blowing similar material from his nose for as long as he could remember while engaged at the factory, he thought that this represented only a single day's accumulation of foundry dust. But he learned otherwise when he took a two weeks vacation in the country, and the black expectoration continued.

Then, one month ago, while at work, he had a severe chill which was followed by fever, sharp pain in the right chest, and aggravation of the previously distressing cough. A diagnosis of pneumonia was made, but response to treatment was unsatisfactory. On the eighth day of the illness he expectorated, in 24 hours, 660 cc. of inky-black, granular material which was held together by pus and mucus, and resembled wet, powd-

\* From The Thoracic Surgical Department, St. Mary's Hospital, San Francisco, California.

\*\*Typical Analysis of FOUNDRY GRAPHITE (Payne-Founder's Manual).

	Stove Plate Graphite Facing	Cheap Green Sand Facing
Specific Gravity	2.36 (Water 1.0)	2.48
Moisture	0.75%	0.45%
Volatile Matter	5.29%	5.75%
Fixed Carbon	56.10%	41.49%
Sulphur	0.20%	0.62%
Ash	37.66% which is made up of	51.69% which is made up of
Silica	25.60%	32.13%
Alumina	5.25%	2.77%
Iron oxide	4.94%	6.78%
Lime	1.07%	1.64%
Magnesia	0.80%	8.32%
<i>This sample said to contain 25% soapstone.</i>		

ered graphite or charcoal. The odor was of a peculiar musty type, but was not foul.

Microscopic examination of the sputum showed many clumps of pus and red blood cells, numerous black broken crystals, and a few colorless crystals. There were no elastic fibers, fusiform organisms, spirochetes, or tubercle bacilli. The smear demonstrated an abundance of gram negative bacilli and a few gram positive diplococci, while cultures revealed diphtheroids, and streptococci of the hemolytic and viridans type.

When this patient was brought to the hospital, four days after the rupture of the abscess, he was in a moribund condition, tremendously emaciated, exhausted, and cyanotic. A large decubitus had already formed on the buttock.

Respirations were shallow and wheezing. Rales, rhonchi, and squeaks of all varieties could be heard throughout both lung fields. There was immobility of the anterior upper half of the right lung field, at which site percussion was impaired, fremitus increased, and breathing amphoric (Fig. 1, p. 308).

Despite general supportive treatment, neoarsphenamine, transfusions, bronchoscopy, and surgical drainage of the abscess on the right, the disease progressed unabated and the patient died.

At autopsy both pleural cavities were completely obliterated by very dense pleural adhesions. The lungs were coal-black and hard as stone. No portion of either lung escaped the pneumonokoniotic process. The abscess cavities were filled with sticky, black, granular material. There was no evidence of tuberculosis (Figs. 2, 3 and 4, p. 308).

Histological study of the lung, by Dr. Elmer W. Smith, showed "very dense scar tissue which was packed full of fine black crystalline material similar to that which had appeared in the sputum. Portions of the scarred area showed necrosis and softening. At other sites there was necrosis with bluish discoloration from the hematoxylin stain, indicating a beginning deposition of calcium salts. In the scattered regions, where the trabeculae of the lung still appeared, there was fine hya-

line scarring which varied from moderate thickening of the septa to complete filling in and fibrosis of the air spaces. Considerable brown pigment, probably hematoidin, was scattered throughout. Other parts of the slide showed large arteriosclerotic and endarteritic vessels with adjacent areas of sloughing and leucocytosis." "Microscopic conclusion: Extensive anthracosis, silicosis, and siderosis with pulmonary fibrosis. The necrosis and degeneration, or abscess formation, should be attributed to these factors and classified as industrial."

### Summary

One case is presented of a 66 year old stove molder who had worked 48 years in a foundry exposed to the inhalation of silica, iron oxide, and fixed carbon. A very extensive pneumonokoniosis ensued, and secondary to this, he developed a bilateral pulmonary abscess from which he died 28 days later. The autopsy report is included.

### Conclusions

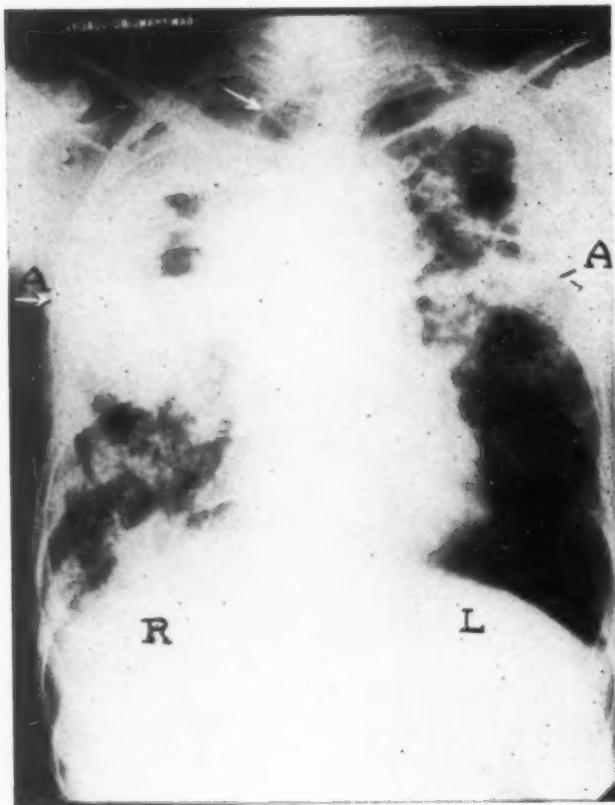
1. As far as I am aware, this is the first reported case of bilateral pulmonary abscess secondary to pneumonokoniosis.
2. I believe lung abscess is a more common complication of pneumonokoniosis than the literature indicates.
3. Molding is an industrial hazard because it leads to the development of pneumonokoniosis.
4. In making awards, as well as in deciding upon the presence or absence of pneumonokoniosis, industrial boards should take cognizance of the fact that the roentgenogram does not indicate the full amount of pneumonokoniosis that is actually present.

384 Post Street.

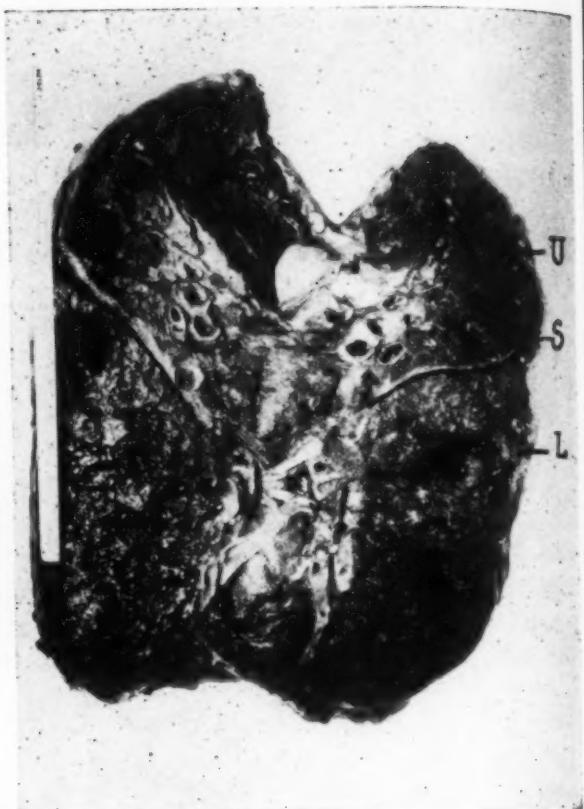
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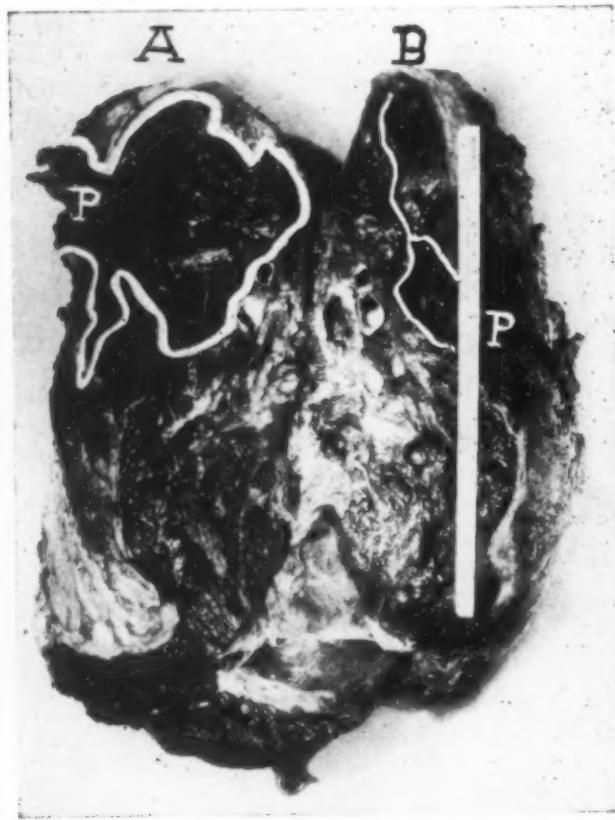
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1 *Pneumokoniosis with Bilateral Pulmonary Abscess.*  
A—abscesses. Unlettered arrows point to the displaced trachea.



2 *Sectioned Pneumonokoniotic Left Lung.*  
U—upper lobe abscess; S—interlobar septum; L—lower lobe abscess.



3. *Sectioned Pneumonokoniotic Right Lung.*  
A—lung spread out to show the magnitude of the abscess. B—abscess as compressed by operative pack. P—point of surgical drainage.



4. *Microscopic Section of Pneumonokoniotic Lung.*

## Trends in Tuberculosis from the Institutional Viewpoint\*

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A declining death rate in any disease tends to lull one into a sense of security and a feeling that the disease is not so important. There is a tendency toward that "let's rest on our oars" feeling—the disease is conquered. Tuberculosis comes within this category, as the death rate has dropped from 200 to around 50 per hundred thousand for the white race. However, we forget that while this makes it seventh among the causes of death for all ages, it is still first in the younger age group. The present decline in the death rate from tuberculosis is an established fact. However, in institutional work it is not so apparent, as will be shown by a review of 7,845 cases that have been hospitalized at the City Tuberculosis Hospital during the past 23 years. We shall attempt through this study to show that certain other avenues of attack must be followed in order to further reduce the death rate from tuberculosis.

The City Tuberculosis Hospital, commonly called Leech Farm, received all types of patients who have pulmonary tuberculosis. Some of them are from good homes, others have been refused at other institutions or, in many cases, have been discharged from other sanatoria, and from Houses of Correction; that is, our patients come from all walks of life, they range from ministers to drunkards, and are a fair cross section of the community. From September 1915, to January 1938, 7,845 patients, ranging in age from eight months to over eighty years, were admitted to the sanatorium. This review is not particularly flattering in many respects to those of us who are connected with tuberculosis work. In 1916, only four per cent of the patients admitted to the institution were in the minimal state. This percentage includes children who were admitted for care or observation. Our figures compare quite similarly with those from other sections of the country where more than 80 per cent of the adults

applying for admission are in the advanced stage of the disease.

Disregarding the public health and humane point of view and looking at the problem only from the economic side, that is, loss of working time to the patient, which can only be estimated, the cost of caring for these advanced cases is approximately three times that of caring for minimal stage cases. The average stay of the minimal case is 8 months, at an approximate cost of \$500.00, while that of the advanced case is 22 months, at an approximate cost of \$1400.00, and certainly the chances of returning these patients to useful work is much less than in those with the early lesions.

We are accustomed to thinking of tuberculosis as a disease that affects only the young, that is, the 15 to 30 age group, and often minimize symptoms found in the older group, especially men complaining of cough, asthma, etc., symptoms which would be suspicious in the young. Twelve per cent of the men admitted in 1916 were 40 years of age or over, and 34 per cent of the men admitted in 1938 were in this age group (an average of 1 man in 3 admitted is over 40 years of age). This group, particularly the males, constitutes a very important sanatorium problem because these patients must necessarily be treated in the institution over a longer period of time, particularly so, because they have a positive sputum. However, lest one get the idea that all patients admitted are in the older group, we call attention to the females, who present a different picture, and one that is very constant for the past 23 years (an average of 1 woman in 10 admitted is over 40 years of age). This contrast is very apparent to one walking through the wards of the institution.

Another group, which constitutes a problem all over the country, and which, together with the older age group, is probably responsible for much of the primary infection in children, is the group that leaves the hospital without permission and, for various reasons, goes

\* Read before the Allegheny County Medical Society, March 18, 1940.

home after three months or less of sanatorium care. This group includes those listed as unimproved or improved on discharge. Regardless of their classification, they cannot be safely presumed to be closed cases if their disease was active on admission. As these patients are referred to the institution through the local, practising physician, it can be safely assumed, even without an examination at the institution, that they are still positive and, as such, are an active source of infection. Thirty-nine per cent of those discharged in 1916 went home in the first three months, while 29 per cent of those discharged in 1938 went home in the first three months—very little change in 23 years.

Refusal of patients to remain in the hospital constitutes one of the greatest difficulties both in the treatment of the individual case and in the protection of the community<sup>1</sup>. A majority of patients remained in the hospital less than ten weeks, 87 per cent remained less than seven months and only 6 per cent remained more than one year. Excluding those who died, 65 per cent of the colored and 40 per cent of the white patients left the hospital against advice. In some cities, such as New York, Philadelphia and Detroit, enforcement of existing legislation enables the authorities forcibly to admit to the hospital and detain infectious patients who do not provide proper care for themselves at home, or who conduct themselves in such a manner that they are a menace to those about them. The large number of patients who leave the Philadelphia General Hospital against advice diminishes to a considerable extent the value of the hospital as a means of protecting the community by isolation of infectious patients.

Dr. Esmond R. Long, managing director of the Phipps Institute in Philadelphia, stated that the refusal of tuberculous patients to retire from the community and accept hospital care constitutes one of the most serious obstacles in controlling the disease.<sup>2</sup> Judge Charles L. Brown of the municipal court in Philadelphia urges compulsory hospitalization for this type of patient. But of course this would necessitate a different type of institution as a patient compelled to submit to sanatorium care would not do so gracefully and would be a problem in confinement.

The number of patients that are sent to

the sanatorium to die is surprising. It would almost seem that in the popular concept of the disease a person is only infectious and a source of danger when he becomes bedfast, but is not dangerous when he is up and walking around no matter how careless he may be with his coughing and spitting. Seventy-five per cent of those who died in the sanatorium in 1916 were in their first three months of hospitalization, 49 per cent of the deaths in 1938 were in the first three months, 22 per cent of the deaths in 1939 were in the first three weeks and 57 per cent in the first three months. The discrepancy in the figures between the opening year (1916) of this institution and the figures at present, becomes obvious when one considers that there is always an increase in the number of sick admitted when a hospital is opened, or when a new addition is ready for patients, as the period after 1922 is practically the same as at present.

The next group shows very little change in twenty-three years. Forty per cent of the total discharges in 1916 were deaths and 33 per cent in 1938 were deaths. This shows a fairly level line through the years and does not give one the idea that there is much change, at least from the institutional side.

Perhaps part of the answer lies in the fact that the waiting list greatly exceeded the admissions at our institution, until 1928. In that year, we opened new additions and for the three years following there was no waiting list. Then the waiting list started to grow again, and, at present, it numbers 133. According to our experience with waiting lists and admissions—"Never the Twain Shall Meet!"

Another answer to the above problem may be the case-finding program carried on among the colored people by the Tuberculosis League Hospital, and directed by Doctor C. H. Marcy and his associates.<sup>3</sup> In 1931-32, before the campaign, the waiting list showed an average of 60 negro patients per year. In 1935-36, following the campaign, there was an average of 139 negro cases per year.

It is very apparent from the above data that on the institutional side, at least, there has been very little change in tuberculosis during the past 23 years. It seems that we have been content to take the patients as they appeared. There is, after all, no incen-

tive to hunt up new cases when it is impossible to hospitalize those that apply by ordinary routine. In fact, a moderately active case could easily become advanced awaiting admittance. This again shows that so long as patients continue to be admitted when in the advanced stage, it will be almost impossible to hospitalize the waiting list, because the far advanced cases occupy a bed for an average of two years. In July of this year, 150 beds will be added to the sanatorium, making 450, yet the waiting list at present contains 133 persons, 98 per cent of whom are listed as bed patients, and the Tuberculosis League probably can add the names of 50 city residents who are eligible for admission. Yet there probably will be beds for the so-called 'up' patients while there will still be a waiting list for bed patients. In July, the city will have a ratio of beds to resident deaths of slightly less than one and one-half beds per death, which is not enough. It should be two per death at least.

From results in other cities, our own negro survey and industrial surveys, it would seem that the only way to change the above condition is by a systematic case-finding program taking in all of certain selected communities, by mass tuberculin testing and x-raying of reactors, or contacts of the whole community. This would make it possible to send cases to the sanatorium earlier, and thus allow a larger turnover in patients for the existing beds. This is a large order, but it has been carried out in Detroit.

Tuberculosis is an insidious disease and rarely has a violent onset. There are many things upon which a cough can be blamed and people *will* continue to use advertised cough syrups instead of seeing a doctor; there are so many reasons for loss of weight and tiredness—from worry and overwork, too much night life—that no one thing can be blamed for the number of advanced cases admitted. Human nature being what it is, these conditions will remain until a concerted case-finding program is instituted and carried out by the Health Department and physicians of the community.

Using the tuberculin test, there are two different views as to the best procedure; that is, should the upper grades in school be tested with the idea of finding new cases among the age group, or should the pre-

school children be tested with the idea of finding the carrier. As the pre-school child's circle of contact is comparatively limited, it is in this group that more headway can be made in eliminating or isolating the carrier and, in addition, the ones that have the primary infection, so that they may be kept under observation in after-years. The ideal way would be to provide x-ray facilities so that whole families could be x-rayed. In this way, the old chronics (which has nothing to do with age) and also the minimal cases would be found, as all cases were in the minimal stage at one time.

It is very necessary to maintain a complete dispensary service. Again, human nature being what it is, discharged patients will not visit their physicians while they are feeling well, unless contacted regularly and reminded to make their monthly visit, which is probably the reason we have 10 to 15 per cent readmissions. In addition to the visiting duties, this service can attend to the contact examinations which average three per patient admitted.

A Patient Registry should be maintained with a central admitting service for the city. This would give an accurate picture of the number of patients and their disposition, and especially care for the follow-up work on discharged patients.

Some form of subsidy or relief, sufficient for maintenance, should be made available to the family when the wage earner is hospitalized, so that the patient will not feel that his family is in want and that he must go home and secure work to support them. The feeling that his people are in want is one of the most common reasons for the males leaving the hospital with a positive sputum, thus acting as carriers and making potential cases for future sanatorium care. The graduate from the sanatorium should be given maintenance while he is completing the cure at home and while he or she remains under the care of a physician, instead of being forced to go to work immediately. It would be much cheaper for the community to furnish maintenance at home than to again hospitalize a patient who has broken down. This maintenance should continue so long as the patient remained under the physician's care and obeyed his instructions.

Provisions should be made for the training

of negro nurses and doctors, both in the sanatoria and clinics, so that they would be fully equipped to care for their own people.

To summarize, there has been very little change in tuberculosis from the institutional side in the past twenty-three years. To remedy this condition there is need for more sanatorium beds and an intensive case-finding

program with a fully equipped dispensary service.

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## Organization News

### Preliminary Report of the Statistical Committee American College of Chest Physicians\*

J. WINTHROP PEABODY, M.D., F.A.C.C.P.\*\*  
Washington, D. C.

As Chairman of the Statistical Committee,\*\* I have a preliminary report to render on the results of a rather complete questionnaire which was sent out to 755 institutions throughout the country. Of this number, responses were received from 31 per cent and a wealth of material has been collected. Additional reports will be published at later dates in the journal, *Diseases of the Chest*.

In view of the fact that only a short period is allowed for this report, but a few of the more important questions will be touched upon at this time.

It is interesting to note that the majority of tax-supported beds are filled and that the average length of time that elapses between the application date and the date of admittance to the institution is approximately 30 days.

A review of the answers to the important questions dealing with treatment has shown the following:

Q. What number of your present patients at the institution are receiving some form

of collapse therapy?

A. 43 per cent.

Q. What number of your present patients are receiving pneumothorax treatment?

A. 33 per cent.

Q. What number of your present patients have been started on pneumothorax during the year 1939?

A. 24 per cent.

Q. State length of time present patients at the sanatorium have been taking pneumothorax?

A. (a) Less than six months —20 per cent.  
(b) Six months to one year—18 per cent.  
(c) One to two years —15 per cent.  
(d) More than two years —14 per cent.

Q. State number of out-patients who were previously resident at the sanatorium, and who are now returning to the sanatorium for refills?

A. (a) Tax-supported institutions —28 per cent.  
(b) Private institutions —21 per cent.

Q. Give the number of initial pneumothoraces during the following years—1930 to 1939.

A. During the last ten years there has been a tremendous increase, at least 40 per cent to 60 per cent or, to be exact, from 20 per cent in 1930 to 78 per cent in 1939.

Q. State the number of patients who have received a phrenic operation during the last five years, 1935 to 1939?

\* Read before the Sixth Annual Meeting of the American College of Chest Physicians, June 8-10, 1940, Biltmore Hotel, New York City.

\*\*Chairman, Statistical Committee. Other members of the Committee are: John H. Allen, M.D., Vice-Chairman, Omaha, Nebraska; Donato G. Alarcon, M.D., Mexico City, D. F.; Miguel Canizares, M.D., Manila, P. I.; Byron M. Harman, M.D., Verona, New Jersey; Elmer Highbarger, M.D., Oil City, Pennsylvania; Chas. L. Ianne, M.D., San Jose, California; A. D. Long, M.D., El Paso, Texas; Raymond H. Runde, M.D., Mt. Vernon, Missouri; John H. Washburn, M.D., Queensland, Australia.

A. The figures show approximately no change.

Q. State the number of patients who have received a thoracoplasty during the last five years?

A. There has been an increase of 85 per cent in five years.

Q. State the number of patients who have been given pneumolysis during the last five years?

A. 8.47 per cent in 1935.  
31.35 per cent in 1939.

Q. State the number of patients who have been given extrapleural pneumothorax during the last five years?

A. 1.69 per cent in 1935.  
22.88 per cent in 1939.

Q. State the number of patients who have been given pneumoperitoneum during the last five years?

A. 5.08 per cent in 1935.  
32.2 per cent in 1939.

Q. State the number of patients who have been given an apicolysis from 1935 to 1939?

A. 2.54 per cent in 1935.  
14.41 per cent in 1939.

Q. State the number of patients who have received bronchoscopy during the last five years.

A. 7.63 per cent in 1935.  
46.61 per cent in 1939.

Q. Do you maintain a clinic in connection with the institution?

A. Tax-supported:  
Yes—43 per cent.  
No—31 per cent.

Private:  
Yes—12 per cent.  
No—14 per cent.

Q. State the number of patients who are attending the clinic, who have never been patients at the institution?

A. Tax-supported:  
average 551 patients per institution.

Private:  
average 54 patients per institution.

Q. How many of those patients are taking pneumothorax treatments?

A. Tax-supported institutions —47 per cent.  
Private institutions —10 per cent.

Questions regarding salary, maintenance, housing, and personnel of physicians, as well as questions regarding the availability of training in these institutions for medical students and post graduate physicians will be covered in a separate report in this Journal.

Questions on occupational therapy, vocational training and rehabilitation are of significance. The brevity of this report makes it impossible to include them at this time.

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## Annual Report for Northwestern States - 1939-1940

American College of Chest Physicians\*

FREDERICK SLYFIELD, M.D., F.A.C.C.P.\*\*  
Seattle, Washington

Considerable progress can be reported during the past year in the tuberculosis field in the four states of the Northwest, namely, Idaho, Montana, Oregon and Washington. This report is a compilation of the efforts of all groups—official and nonofficial—interested in tuberculosis eradication, as well as the activities of the committee.

### *Tuberculosis Deaths and Death-Rates*

The 1938 tuberculosis deaths for the four

states were 1368. The death rate in each of the four states remained well below that of the nation as a whole.

### *Sanatoria*

Oregon and Montana both report increased sanatorium facilities for their states. In Oregon, the new University State Tuberculosis Hospital in Portland was opened in November 1939, and provides beds for 80 patients. It is fully equipped for clinic and out-patient service. It is also to be used as a teaching center for the medical school. In Montana there has been an addition of 58 single rooms to the

\* Read at the Sixth Annual Meeting of the American College of Chest Physicians, June 8-10, 1940, Biltmore Hotel, New York City.

\*\*Governor for Washington, American College of Chest Physicians.

Montana State Tuberculosis Sanatorium at Deer Lodge which is a great aid in supplying needed bed capacity. However, beds for tuberculosis patients are still not adequate and there are waiting lists at several of the institutions.

#### *Case Finding*

In the four states, tuberculin testing has been carried on in increasing volume and more than 75,000 tests were reported during 1939. In Montana, every high school student has had the tuberculin test and all of those having a positive reaction have been x-rayed. This is a cooperative program of the Montana Tuberculosis Association and the State Board of Health. At the University of Montana in Missoula and the State College in Bozeman intensive campaigns for case-finding have been carried on. The School of Mines at Butte and the Polytechnic at Billings have conducted surveys for tuberculosis among their students.

With the cooperation of the Women's Club, groups of women have been tested and x-rayed and it is the desire of Dr. Terrill, of the Committee for the Advancement of Tuberculosis Organization in Medicine, to ask that the group testing of adults be adopted as a program of the State Federation of Women's Clubs. He has also expressed the wish that the State Board of Health furnish tuberculin to private physicians in order to encourage more testing of patients.

In the State of Washington a recent regulation by the State Board of Health requires that all persons employed in any school in the state shall be examined for evidence of tuberculosis. A Mantoux test shall be given and, if positive, a satisfactory x-ray of the chest must be submitted to the State Department of Health. If no test is taken, then an x-ray must be filed. In addition to this the State Department of Health has employed an x-ray technician to inspect all equipment used in the state.

Special case-finding programs were instituted in two of the colleges in the State through the cooperation of the Tuberculosis Committee of the Washington State Medical Association and the Washington Tuberculosis Association. Dr. John E. Nelson, a Fellow of the College and Chairman of the Tuberculosis

Committee, delivered the lectures before these groups.

This committee has also conducted a study in the hospitals of the state which have training schools, in order to determine the health factors surrounding the student nurses. Special emphasis has been placed on tuberculous infection and development. A report of this study has not yet been made. A number of the tuberculosis leagues throughout the state furnish tuberculin to private physicians for testing of patients in their offices. X-ray service is also provided in cases of need.

In Idaho a full time tuberculosis consultation service for the state has been established and is jointly financed by the State Department of Health and the Idaho Anti-Tuberculosis Association. This service has greatly aided in the case-finding program.

In Oregon, through the cooperation of the Oregon Tuberculosis Association and the Medical Director of the Warm Springs Indian Reservation, a case-finding program was inaugurated to determine the local incidence of tuberculosis. The plan used was to tuberculin test all Indian children and adolescents, with x-ray provided for the reactors; adults were to be x-rayed without a previous tuberculin test. The Medical Director of the Eastern Oregon State Tuberculosis Hospital, Dr. O'Dell, a Fellow of the College, assisted with the program which was carried on at the Reservation Hospital. Nursing service was furnished by the tuberculosis association.

#### *Case Reporting*

New cases of tuberculosis reported in 1938 numbered 2846, a decrease of 168 from the preceding year; however, with a reduction in actual deaths the case rate per death increased slightly from 2.05 to 2.08 for 1938.

It would appear that there has been no marked improvement in case reporting generally and that the first notification of a tuberculosis case still comes too frequently from the death certificate.

#### *Rehabilitation*

Rehabilitation work has continued in the four states chiefly under the Vocational Rehabilitation Department of the several states. In Oregon a full time rehabilitation agent was appointed in September 1939, to work

*(Continued to page 316)*

## Chenik Hospital

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Thoroughly Equipped for the Medical and Surgical Treatment of the Tuberculous  
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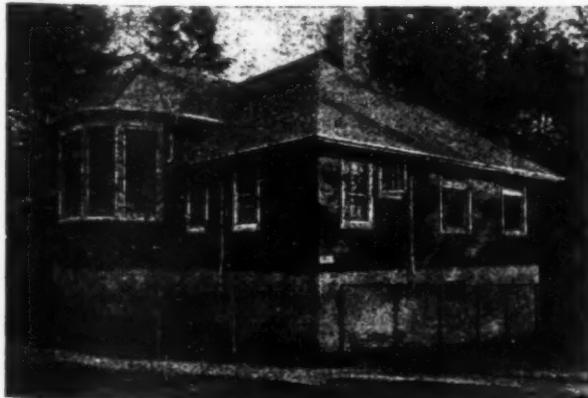
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A thoroughly equipped institution for the modern medical and surgical treatment of tuberculosis. An especially constructed unit for thoracic surgery. The most recent advances in pneumolysis applied to those cases demanding this branch of intrathoracic surgery.

### MODERATE RATES

Descriptive Booklet on Request

### MEDICAL DIRECTORS

Ralph C. Matson, M.D., & Marr Biscaillet, M.D.

1004 Stevens Building

Portland, Oregon

(Continued from page 314)

exclusively with those handicapped by tuberculosis. This program was sponsored jointly by the State Board for Vocational Education and the Oregon Tuberculosis Association.

#### Health Education

The major portion of health education has been carried on by the tuberculosis associations and their affiliated groups. Much use has been made of the newspapers, motion pictures, posters, radio and literature from the National Tuberculosis Association. The tuberculosis committees of the State Medical Associations have supplemented these groups with increased service chiefly through papers, illustrated lectures and talks. In Idaho the tuberculosis consultant has written newspaper articles, lectured regularly to all the student nurses in all hospitals in the state and assisted with the development of school and adult educational programs.

In Montana several medical talks covering case-finding, diagnosis, x-ray and treatment have been given by the chairman of the committee before all of the county medical societies as well as addresses before lay groups. Dr. Stewart of the University of Minnesota, Pediatrics Department, was the guest speaker of the Montana Tuberculosis Association at their annual meeting.

The physicians doing chest work in Oregon have assisted with the programs of health education whenever it has been possible.

In Washington a series of ten lectures have been given as a part of the regular course of study for the student nurses in four of the large hospitals with training schools. These lectures were given by the Chairman of the Tuberculosis Committee of the Washington State Medical Association and by the writer, your governor for Washington. This is a continuation of work that was started many years ago. In addition to this an affiliation for training student nurses has been developed by the general hospitals with several sanatoria for a six weeks training period in the sanatorium for each student.

At the invitation of your governor for Washington, Dr. Max Pinner, Editor of the *American Review of Tuberculosis*, spoke before the Seattle Academy of Medicine to which all members of the College in this region were invited. Dr. Pinner also addressed

the King County Medical Society during his visit to the state.

A valuable contribution to the health education activities of the Northwest was the series of lectures given by William Doppler, Ph.D. of the National Tuberculosis Association during his recent trip in the West.

The chest physicians of the State of Washington had the opportunity for a day of conference with Dr. J. Arthur Myers, Professor of Preventive Medicine in the University of Minnesota, when he was present at the annual meeting of the Washington Tuberculosis Association.

#### General Information

Membership in the American College of Chest Physicians has been increased by four in this district. The magazine *Diseases of the Chest* continues to serve approximately 375 subscribers in this territory. A study covering a four year period of the tuberculin testing results for 3421 college students in the State of Washington was compiled by the Washington Tuberculosis Association and was published in the *Journal-Lancet*, Minneapolis. A "Symposium on Tuberculosis" was prepared at the request of the Tuberculosis Committee of the Washington State Medical Association and appeared in the September 1939 issue of *Northwest Medicine*, the official publication of the State Medical Associations of Idaho, Oregon and Washington. Seven of the articles in this symposium were contributed by Fellows of the College.

#### Summary

1. The tuberculosis death rate for 1938 in the four states of the Northwest continues below that of the nation as a whole.

2. Additional sanatorium facilities have been provided by the building of the new University State Tuberculosis Hospital in Portland which opened in November, 1939 with a bed capacity of 80. An addition of 58 single rooms was also made at the Montana State Tuberculosis Sanatorium at Deer Lodge.

3. More than 75,000 tuberculin tests were reported in the case finding projects in the four states. A recent regulation by the Board of Health for the State of Washington requires an examination for tuberculosis, including tuberculin test and x-ray, for all

(Continued to page 318)

## TUBERCULOSIS Often Has An Acute Onset.

The chronic part is the recovery. Early combination of pneumothorax and sanatorium care does much to lessen that chronicity.

## DEVITT'S CAMP for TUBERCULOSIS

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Associate Physicians

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A. D. LONG, M.D.  
MEDICAL DIRECTOR

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SISTER MARY EDWARD, Superintendent

E. W. HAYES, M.D., Medical Director

(Continued from page 316)  
persons employed in any school in the state.

In Idaho a full time Tuberculosis Consultation Service has been established. In Oregon a case finding program was inaugurated to determine the incidence of tuberculosis on the Warm Springs Indian Reservation. In Montana the x-raying of all reactors has been a feature of their case-finding.

4. Case reporting of tuberculosis continues

at the rate of approximately two new cases per death.

5. Rehabilitation service was increased especially in the State of Oregon by the appointment of a full time rehabilitation agent.

6. Health education work has been done through all available sources with especial assistance from recognized authorities and the publication of articles by physicians engaged in chest therapy.

(Continued from page 295)

Jay Arthur Myers, Minneapolis, Chairman; Victor F. Cullen, Maryland, Vice-Chairman; Paul H. Holinger, Chicago; Robinson Bosworth, Illinois; Col. Mack M. Green, Canal Zone; Robert B. Homan, Texas; Carl R. Howson, Los Angeles; Smith J. Mann, Wash-

ington, D. C.; C. Howard Marcy, Pittsburgh; Louis J. Moorman, Oklahoma; George G. Ornstein, New York; Richard H. Overholt, Massachusetts.

Application forms may also be obtained from the Governors of the College in your state.

F. W. B.

#### POSTGRADUATE COURSE IN TUBERCULOSIS

Directed by the personnel of the Tuberculosis Sanatorium of Huipulco, D. F., Mexico, and the Medical Faculty of the University Nacional Autónoma, a series of Postgraduate Courses in tuberculosis will be held at the sanatorium from the ninth of September to the ninth of October. The *Sociedad Mexicana de Estudios sobre Tuberculosis* will act as sponsors. There will be two sections to the course, the first lasting twelve days; the second, twenty days. In order to attend the second sessions, designed for specialists or doctors wishing to become specialists, it will be necessary to attend the first section. This second section will be limited to ten men.

Among the professors are Dr. Donato G. Alarcón, Governor of the College for Mexico, and Dr. I. Cosio Villegas, Fellow of the College, both of Mexico City.

Dr. Villegas is in charge of registrations and the cost of the courses is 50 pesos for the first, and 100 pesos for the second.

#### COURSES IN TUBERCULOSIS

Short courses in tuberculosis are being offered to practicing physicians by the Indiana Tuberculosis Association. The courses will be given at nine sanatoria throughout the state. For complete information write to the Association at 1219 Security Trust Building, Indianapolis.

#### W A N T E D

Young physicians interested in tuberculous and non-tuberculous pulmonary conditions for Residencies and Assistant Residencies in New York City Hospital. Requirements: at least one year's internship; preference given for two year's internship. Maintenance and salary given; also, special training. Write Box A-13, American College of Chest Physicians, 500 North Dearborn Street, Chicago, Illinois, for further details.